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ACHIEVING PERFORMANCE-BASED LIFECYCLE MANAGEMENT

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by

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The following article is taken as an excerpt from the proceedings of the annual Acquisition Research Program. This annual event showcases the research projects funded through the Acquisition Research Program at the Graduate School of Business and Public Policy at the Naval Postgraduate School. Featuring keynote speakers, plenary panels, multiple panel sessions, a student research poster show and social events, the Annual Acquisition Research Symposium offers a candid environment where high-ranking Department of Defense (DoD) officials, industry officials, accomplished faculty and military students are encouraged to collaborate on finding applicable solutions to the challenges facing acquisition policies and processes within the DoD today. By jointly and publicly questioning the norms of industry and academia, the resulting research benefits from myriad perspectives and collaborations which can identify better solutions and practices in acquisition, contract, financial, logistics and program management.

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Achieving Performance-based Lifecycle Management

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Abstract

In July of 2008, Mr. John J. Young, Jr., Under Secretary of Defense for Acquisition, Technology and Logistics, issued a memorandum titled *Implementing Lifecycle Management Framework*. The memorandum addresses the need for Performance-based Lifecycle Management and is the Department of Defense's (DoD) most recent effort to improve weapon system readiness while reducing costs and cycle-times.

Since the end of the Second World War, the United States DoD developed and refined an acquisition process focused on responding to a predictable, monolithic threat. The process



built upon several underlying principles, including a desire for US technological superiority, a competitive industrial base, and a relatively long planning and requirements horizon. Over the course of 60 years, the DoD attempted to improve its acquisition and lifecycle process through a series of incremental changes to address requirements creep, cost growth, funding instability, and technical risk.

Currently, the US faces significant economic and national security threats from near-peer competitors, rogue states, and transnational terrorist organizations. This multiplicity of threats requires an agile, cost-efficient process to mature and sustain military capabilities. A fundamental change to DoD lifecycle management is required to achieve that necessary agility.

This paper explores fundamental changes within government and industry to evolve a highly agile and responsive lifecycle process. Such a process would include effects-based requirements to enable effective cost/performance trades, a commercially driven research and development model to instill technology and requirements discipline, and industry provided lifecycle product support based on best-in-class performance. This paper summarizes those changes to enable and enhanced readiness.

***“The only thing harder than getting a new idea into the military mind
is getting an old one out.”***
—B. H. Liddell Hart

Background

The Department of Defense (DoD) acquisition and sustainment processes are straining under the demands of the Global War on Terror, an increase in Congressional oversight, and an emerging shortage of skilled acquisition and sustainment professionals. Significant cost and schedule growth, extended development cycles, schedule delays, elongated logistics response times, and increasing backorders are evidence of those strains. The Government Accountability Office (GAO) documented a 36% percent cost growth for major defense acquisition programs and characterized DoD logistics as high risk (GAO, 2008a). Additionally, the DoD continues to struggle to keep pace with and develop new technologies and is no longer the catalyst driving the development of new revolutionary technology (Hagar, 2008).

In July 2008, the Defense Science Board (DSB) issued its report, “Creating an Effective National Security Industrial Base for the 21st Century: An Action Plan to Address the Coming Crisis.” The report provided several specific recommendations to enable the DoD to achieve lower costs, field capabilities faster, and improve logistics support. The DoD also recently issued revised guidance on implementing a lifecycle management framework that focuses on lifecycle metrics, aligning resources and readiness, and implementing performance-based lifecycle product support (Young, 2008).

Our current national security posture and federal budget dictate that the DoD and industry continue to explore and refine new acquisition and sustainment processes to enable greater agility and capability at reduced costs. Capitalizing on market forces as an alternative to government regulations will permit the DoD to achieve the desired agility. In order to comprehend the challenges the DoD faces in achieving that agility, one must first review the path that the DoD and industry have traveled since World War II.



The World War II Acquisition and Logistics Environment

The acquisition process during the Second World War focused on mass production of weapon and support systems, as the American economy served as the heart of the Allied war effort. The United States produced over 2.4 million vehicles, 88,000 tanks, and 303,000 aircraft during the war with the lend-lease program exporting \$57.4 billion worth of equipment to its allies. The US industrial complex was beyond the range of enemy attack, resulting in production numbers that exceeded that of the Allies and the enemy combined (Dana, 1998). The ability of US industrial base to rapidly transition from civilian to defense production enabled the Allied victory in World War II (Dana, 1998).

Acquisition and Logistics during the Cold War

In 1945, as Americans celebrated the end of World War II, US industrial capacity transitioned from a wartime footing to a commercial market burgeoning with pent-up demand. Commonality in manufacturing processes, similarity in products, and a dramatic increase in demand for consumer durables made for a relatively smooth transition to a peacetime, consumer-driven economy.

The subsequent emergence of the Soviet Union as a peer competitor gave birth to a dedicated defense industry that focused on developing and manufacturing the increasingly complex systems needed for deterrence (Defense Science Board, 2006). Weapons system acquisition during this period displayed several critical market characteristics:

1. A monolithic threat enabled the US to concentrate on relatively stable and predictable requirements
2. A national decision to capitalize on technology to seize and maintain qualitative superiority led the DoD and industry to concentrate on equipment performance
3. A robust set of industrial competitors enabled the DoD to experiment, develop, and prototype needed technologies while capitalizing on competitive market forces
4. A national decision to forward deploy forces in Europe and Korea encouraged large logistics footprints of supplies, personnel, and maintenance facilities to also be forward deployed
5. A national will that supported DoD efforts and provided funding at approximately 5-15% of the GDP (Center for Strategic and Budgetary Assessments, 2006)
6. A supportive environment of exploratory technology that tolerated test failures and allowed new data findings

The DoD and industry became increasingly governed by unique government practices—first in engineering and manufacturing, then in finance and business, with the DoD specifications and standards numbering 30,000 by 1980 (Poston, 2003). These specifications and standards drove a wedge between defense and commercial industries and served as significant barriers for non-defense firms trying to enter the defense market.



By the early 1980s, the need to improve DoD acquisition was apparent. Numerous studies and academic research efforts documented DoD challenges with requirements stability, technical/risk management, funding stability, and schedule adherence (GAO, 1982). After nearly three decades of Cold War, the national will was shifting to demand more efficiency and accountability within defense acquisition.

The Reagan Era

Beginning in the early 1980s, a series of incremental policy directives attempted to address skyrocketing weapons costs and increasing development schedules. In April 1981, Deputy Secretary of Defense Frank Carlucci presented thirty-two initiatives for reducing weapons systems costs, shortening development time and improving weapons readiness and support.(Carlucci, 1981). One goal of the initiatives was to control cost growth by attempting to achieve realism in cost estimating.

Secretary Carlucci introduced the concept of Preplanned Product Improvement (P3I), a means to deploy systems and sequentially upgrade them over time (Carlucci, 1981). This strategy was intended to minimize technological risk, and quicken the pace of modernization of the nation's armed forces. Other recommendations included the production of weapons systems at more efficient rates, reduction in the number of DoD directives, more advantageous use of competition, and greater use of standardized subsystems and support equipment. These initiatives represented a comprehensive list of measures with the potential to lower costs, but did not address the major causes of cost growth in weapons systems such as technical risk, requirements creep, and cost-plus business arrangements (Foelber, 1982).

During this period, Congress also took steps to curb the rising cost of weapons systems including the introduction of more rigorous DoD reporting requirements, the establishment of audit procedures for acquisition activities, and wider use of multi-year contracts (Lockwood, 1983).

The Packard Commission

President Reagan established the Packard Commission in 1986 to reduce the inefficiencies in the defense procurement system, with an emphasis on the acquisition process. The Commission's conclusions supported the results of numerous prior studies, reporting that the acquisition process suffered from schedule delays, cost overruns, and inefficient performance (Blue Ribbon Commission on Defense Management, 1986). The Commission recommended streamlining the acquisition process, increasing the amount of tests and prototypes, and improving planning.

A subsequent review of 269 completed defense contracts found that the Packard Commission's recommendations were ineffective in reducing cost overruns. Despite implementing over two dozen initiatives, there was no considerable progress in defense program cost performance for over 30 years (Christensen Searle & Vickery, 1992). The recommendations did little to fundamentally change the DoD reward mechanisms that favored expensive, long programs. (See Table 1.)



**Table 1. The Effect of Packard Commission Recommendations
on Defense Cost Performance**
(Christensen, Searle & Vickery, 1992)

	All Contracts	Contract Phase		Managing Services		
		Development Contracts	Production Contracts	Air Force	Navy	Army
Number of Contracts (n)	269	8	188	113	134	22
Final overrun before implementation (%)	5.6	4.1	6.2	2.8	7.6	8.1
Final overrun after implementation (%)	9.5	15.3	7.2	12.7	6.1	17.0
Difference (%)	3.9	11.2	1.0	9.9	-1.5	8.9
Statistical significance (p)	0.055	0.014	0.294	0.003	0.206	0.110

The End of the Cold War

By the end of the Cold War, an industrial structure, an acquisition process, and a logistics system existed that were mismatched with the priorities of the American people and the global environment. The DoD had honed an acquisition process that focused on providing technologically superior systems with industry geared up to produce those systems in large quantities. With the dissolution of Soviet Union, the American public shifted its priorities to domestic issues. Multiple administrations through the 1990s responded to this shift in focus through force reductions, base closures, and industrial consolidation (GlobalSecurity.org, 2003).

Specifications and Standards Reform

In 1994, Secretary of Defense William Perry issued DoD policy to increase access to state-of-the-art technology and adopt the same business practices as world-class commercial suppliers. The directive attempted to reduce the complexity and costs that the DoD incurred when purchasing major weapon systems and their numerous maintenance requirements.

Secretary Perry chartered a detailed cost analysis allowing the DoD to determine the most important cost drivers in the quest for standards reform. The study concluded that, on average, the DoD paid a regulatory cost premium of approximately 18 percent. The study also indicated that significant cost savings were achievable through reductions in DoD regulation and oversight (Coopers & Lybrand/TASC Inc., 1994). Since Secretary Perry introduced his plan to reform the acquisition process, over 1200 commercial standards have been adopted by the DoD; however, the DoD has not fully capitalized on commercially available solutions (OSD(PA), 1994).

The procurement accounts declined in the late 1990s, with fewer new systems under development and existing weapons platforms aging and continuing service past their intended lifecycles. This extended use resulted in increasing operations and maintenance (O&M) costs, which contributed to a lifecycle “death spiral” of further deferred modernization, as shown in Figure 1 (Gansler, 1998).

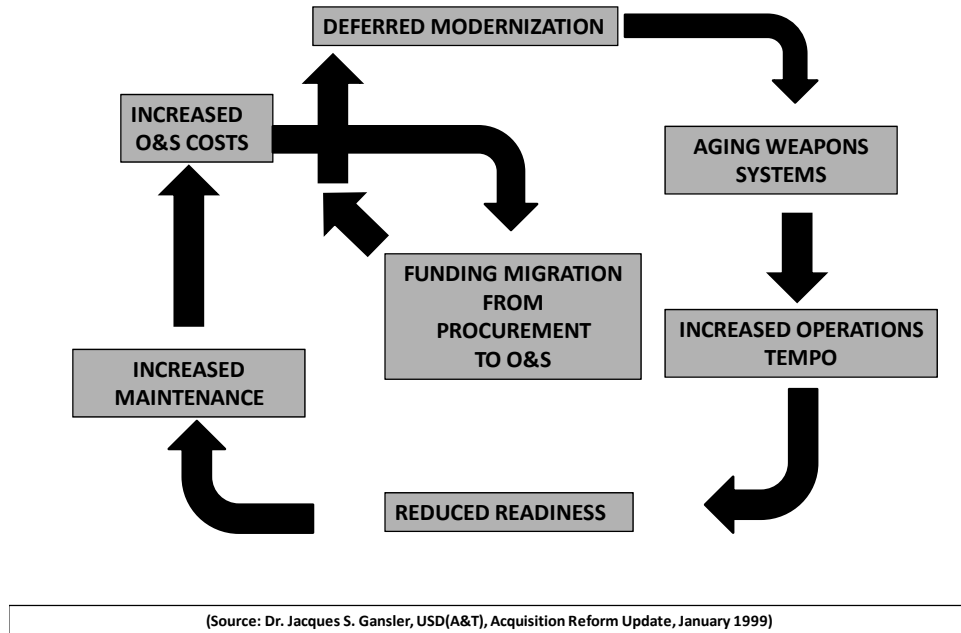


Figure 1. The DoD “Death Spiral”

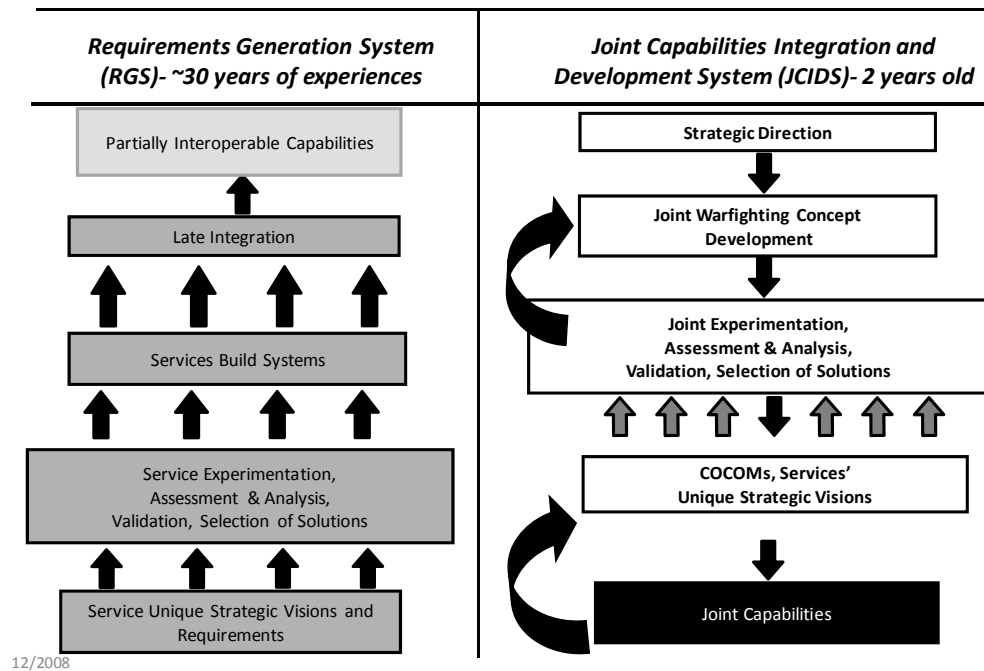
To attack this “death spiral,” the Under Secretary launched an aggressive acquisition and logistics reform effort. Key initiatives included increased use of commercial items, evolutionary acquisition, streamlined acquisition documentation, and performance-based logistics. These initiatives emphasized greater civil-military integration and were directed towards increasing acquisition and logistics agility.

Joint Capabilities Integration Development System (JCIDS)

Joint Capabilities Integration Development System (JCIDS) is the DoD’s procedure to define acquisition requirements and evaluation criteria for future defense programs. JCIDS was created in 2003 to address shortfalls in the DoD requirements generation system identified by the US Joint Chiefs of Staff, including not considering new programs in the context of other programs, not sufficiently considering combined service requirements, not effectively prioritizing joint service requirements, and not accomplishing sufficient analysis.

The JCIDS process codifies a DoD policy shift away from threat-based assessments to capabilities-based assessments of Warfighter needs. As a replacement for developing, producing and fielding systems based on perceived threats to the nation, JCIDS policy enables the development of capabilities based on strategic direction and priorities defined in the National Military Strategy and National Defense Strategy (Chadwick, 2007). (See Table 2.)

Table 2. Threat vs. Capability-based Planning
(Bromberg, 2006)

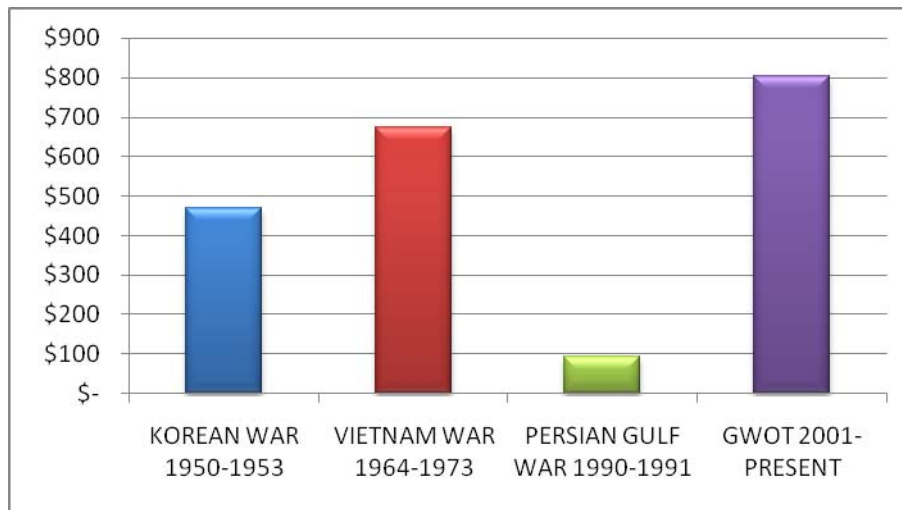


The Global War on Terror

Despite the perceived “peace dividend,” the migration from a bi-polar world to a multi-polar world proved more challenging than anticipated. The DoD continued to rely on acquisition processes, organizations and infrastructure largely developed in the years following World War II. Technical superiority had proven successful against a peer competitor; however, rapid advancement in commercially available computing and telecommunications gave rise to multiple new threats: e.g., transnational terrorism and rogue state actors. This multiplicity of threats demanded greater agility and innovation at the same time DoD acquisition and its associated industrial base were contracting. September 11, 2001, proved these threats very real, initiating the ongoing Global War on Terror (GWOT).

Executing the GWOT is an expensive endeavor. The total amount of GWOT funding provided over the past seven years is approximately \$804 billion. This makes the GWOT more expensive than both the Korean (\$460 billion) and the Vietnam (\$650 billion) wars (Serafino, 2001). (See Table 3.)

Table 3. Cost of Selected Wars (in billions of \$2007)
(National Priorities Project, 2007)



The GWOT to date has provided the United States with lessons directly related to DoD acquisition and sustainment. These lessons include:

- Our requirements process is slow to react to a rapidly adaptive adversary.
- Our acquisition process consumes billions of dollars against threats generated at a fraction of that cost.
- Our mass logistics structure is insufficient to support rapid, dispersed forces.

In September 2008, Secretary Robert Gates spoke at the National Defense University and addressed these issues:

The need for the state of the art systems—particularly longer range capabilities—will never go away, as we strive to offset the countermeasures being developed by other nations. But at a certain point, given the types of situations we are likely to face—and given, for example, the struggles to field up-armored HUMVEES, MRAPs, and ISR in Iraq—it **begs the question whether specialized, often relatively low-tech equipment for stability and counterinsurgency missions is also needed.**

Secretary Gates continued:

And how do we institutionalize procurement of such capabilities—and the ability to get them fielded quickly? Why did we have to go outside the normal bureaucratic process to develop counter-IED technologies, to build MRAPs, and to quickly expand our ISR capability? **In short, why did we have to bypass existing institutions and procedures to get the capabilities we need to protect our troops and pursue the wars we are in?** Our conventional modernization programs seek a 99 percent solution in years. Stability and counterinsurgency missions—the wars we are in—require 75 percent solutions in months. The challenge is whether in our bureaucracy and in our minds these two different paradigms can be made to coexist.

Time for Change

Since the end of World War II, the United States DoD developed and refined an acquisition process focused on responding to a predictable, monolithic threat. This process built upon several underlying principals including a desire for US technological superiority, a competitive industrial base, and a relatively long planning and requirements horizon. Over the course of 60 years, the DoD attempted to improve its acquisition and lifecycle process through a series of incremental changes to address requirements creep, cost growth, funding instability, and technical risk.

Currently, major weapon system programs within the DoD are taking longer to complete, costing more, and delivering quantities far lower than originally intended. The total acquisition cost of the DoD's 2007 major programs has increased by almost \$300 billion over preliminary estimates (GAO, 2008a). Weapon system programs often begin without adequate information pertaining to requirements, technology, and design maturity. Lacking such knowledge, program managers often rely on unrealistic assumptions that increase program risk, cost growth and schedule delays (GAO, 2008a). Finally, the geopolitical environment has changed dramatically over the past 60 years, as summarized in Table 4.

Table 4. Geopolitical Differences

1945 - 1990	Today
Threat: Bipolar threat. Enabled the US to concentrate on relatively stable and predictable requirements (Soviet Union)	Threat: Multi-polar threat. Transnational terrorism, near-peer competitors, and rogue state actors
Technology: A national decision to capitalize on technology to seize and maintain qualitative superiority led DoD and industry to concentrate on equipment performance. Military technology as the driving force	Technology: DoD no longer the catalyst driving the development of new revolutionary technology. Commercial technology the driving force
Requirements: Concentrated on relatively stable and predictable requirements. Match or counter Soviet weapons systems	Requirements: Unpredictable and unstable with the multiplicity of threats and behavior adversaries with current events driving requirements
Acquisition & Sustainment: A robust set of conventional industrial competitors enabled DoD to experiment, develop, and prototype needed technologies while capitalizing on competitive market forces. Incremental change	Acquisition & Sustainment: Systems and cost demands of the Global War of Terror, increasing Congressional oversight, and a shortage of skilled acquisition and sustainment professionals. Significant cost and scheduled growth of major defense programs, extended development cycles, schedule slips, elongated logistics response times, and increasing backorders
National Will: A national will that supported DoD efforts and provided funding at approximately 5-15% of the GDP	National Will: National will skeptical and increasingly unwilling to accept continued rampant defense spending

The United States DoD can no longer afford to follow the path of incremental change to its acquisition and logistics process and must fundamentally transform its current acquisition practice. The acquisition and logistics environment of the 21st century needs a course of action that will decisively enable greater agility and efficiency through effects-based requirements; commercially driven research and development; and industry-provided lifecycle product support processes.

Becoming Highly Agile and Responsive

Effects-based Requirements

“Requirements creep” has been a persistent problem within defense acquisition since World War II. This “creep” is driven by the DoD focus on technological superiority and the military services historic bias towards unique requirements. The JCIDS process (and subsequent portfolio management) was intended to correct these problems; however, the Joint Staff was never fully resourced to develop capstone and integrating concepts. As a result, the JCIDS process continues to be dominated by Service-driven requirements.

To compensate, DoD is implementing an increasing number of common critical performance parameters to enhance system inter-operability and “jointness.” These requirements tend to be overlaid on top of Service-driven performance requirements. Requirements packages for major systems continue to be large, complex, and, in many cases, contradictory.

In order for the DoD to enhance agility, it must begin with a requirements process that is appropriately focused on the military effort that is required. Requirements would be characterized based upon desired effect or outcome, rather than as a specific system. Such an approach would make maximum use of Joint Staff resources for integrated “Concepts of Operation,” while fostering innovation within the Services and industry to develop competing solutions. Industry would be empowered to provide a specific capability rapidly, within the constraints of the “Concept of Operations.”

The Joint Mine Resistant Ambush Protected (MRAP) Vehicle Program (JMVP) currently offers a good example of what an innovative and agile DoD acquisition process could look like. **The MRAP program is the largest and fastest military acquisition buildup since World War II, with the DOD utilizing an acquisition strategy to rapidly acquire and field MRAP vehicles.** The MRAP acquisition program established minimal operational requirements and relied heavily on commercially available products (GAO, 2008b).

The DoD designated the MRAP program as DoD’s highest priority acquisition, which helped contractors and other industry partners to rapidly respond to the urgent need and meet production requirements with industry partners. This facilitated rapid fielding by generally meeting or exceeding planned production rates. This agile and responsive acquisition process saved lives and made an exponential contribution to warfighter readiness (GAO, 2008b).

Industry-driven Research and Development

The DoD acquisition process reinforces unique solutions via built in bias for large, long cost-plus development programs. These programs inherently embody incentives for cost and schedule growth and limited incentives for efficiency. The DoD and the Congress have attempted to regulate efficiency for 20 years via increased oversight and reporting, but the overall process seems impervious to incremental change.

Advances in technology research and development (R&D) are currently led by the commercial world, where R&D has increased steadily at a rate of about 5% per year for more than 20 years. During this same 20-year period, DoD and government R&D spending dropped 2.5% per year (Gansler, 2000). In order for the DoD to capitalize on commercial investment, it must actively engage the commercial market.



The “new normal” of persistent conflict and stabilization engagement demands a “new normal” research and development business model. Such a model would be more akin to the commercial development process, where industry manages product R&D (and is fully responsible for technology maturation of that product). The DoD would continue to invest in basic research within the 6.1 and 6.2 accounts and in test and evaluation of competing prototypes.

This approach would incentivize industry to control requirements creep, select mature technologies for product integration, and develop solutions in an incremental, timely fashion. Such a system would inherently incentivize industry, since industry would be funding the development (versus the cost-plus development of today) and provide a meaningful business driven mechanism to moderate technical risk and ensure technical maturity (versus the technology readiness levels used today).

Such an approach may not be applicable for complex, high-risk defense items (aircraft carriers, as an example); however, it should be appropriate for a growing number of items required for “persistent presence.” In addition, this approach will require fundamental change within the DoD to accept industry-natured technologies and equipment built to commercial standards.

Industry Provided Lifecycle Product Support

The DoD has recently embraced an innovative approach for procuring logistics support for its weapons systems. In the 2001 *Quadrennial Defense Review*, the DoD mandated the implementation of Performance-based Logistics with the goal to gain the most efficient and effective performance of weapons systems throughout their lifecycles, and to build successful business partnerships that align with the goals of all involved parties for the duration of these programs (Berkowitz, 2005). PBL is a business partnership model designed to align the interests of both the DoD and the logistics service provider: creating value and the desired outcomes of both partners. This yields a more cooperative venture than merely achieving service level agreements or getting the lowest price from the provider.

PBLs have demonstrated success by providing superior logistics support for simple parts such as aviation tires, subsystems such as engines, and complete weapon systems (e.g., F-22). PBLs have demonstrated improved weapons systems readiness and equipment availability through the development of incentives for industry investment and partnerships. There are more than 200 PBL efforts DoD-wide that have demonstrated material availability above 95 percent and commercial response times of 2-4 days (versus DoD average of 16 days) (Estevez, 2005). (See Table 5 and 6 for PBL success examples.)



Table 5. Availability, Cycle-time, and Cost Benefits of Performance-based Logistics
(Fowler, 2008)

PROGRAM	AVAILABILITY BENEFITS
F/A-18	+ 23%; 98% RFT
F/A-18 SMS	32%
H-60 Avionics	14%
Tires	17%
AEGIS	30%
F-404 Engine	46%
T-700	35%
CIWS	9%
Mk41 VLS	8%
Sea Sparrow	14%
Navy Spt Equip	32%
Nimrod (UK)	40%
AN/ALQ-126B	50%
AN/USM-638	40%
LANTRIN	17%
EA-6B Flt Cont	47%
F-22	+ 15% MC

PROGRAM	AVAILABILITY BENEFITS
B-2	47.2% MC (Record Level)
E-8	99.5% Lch Rt; 97.6% ME
ALR-67(v)3	97% Avail
Sentinel	95% Avail
Shadow	96%+ OR
TAIS	98%+ Avail
Javelin	99%+ OR
ITAS	99% Avail
CGS	99% Avail
HIMARS	98.7% Avail
C-17	93.5% Dpt Rel ; 85.4%MC
C-17 Engines	70% TOW incr
T56-15 Engines	+ 35% TOW
APS-137	+ 40% TOW
AN/PSS-14	95% Eff Rate
F414 Engine	97% Avail
Patriot	- 99% B/O's

PROGRAM	AVAILABILITY BENEFITS
F/A-18	-74% LRT; -33% RTAT
F/A-18 SMS	- 84% LRT
H-60 Avionics	- 85% LRT
Tires	-92% LRT; -100% B/O's
APUs	- 82%LRT
LANTRIN	- 90% LRT
F-404 Engine	- 25% RTAT
T-700	-74% RTAT; -100% B/O's
AH-64 Apache	- 35% RTAT
Pegasus Engine	- 59% RTAT
CH-47 (UK)	- 44% RTAT
F-22	- 20% RTAT
B-2	- 20% RTAT (Depot)
CIWS	- 99% B/O's
Sea Sparrow	- 90% B/O's
F-404	- 66%B/O's
RFTLTS	- 96% LRT

RFT - Ready for Tasking
MC - Mission Capable
OR - Operational Readiness
ME - Mission Effectiveness

TOW - Time-on-Wing
B/O's - Backorders
LRT - Logistics Response Time
RTAT - Repair Turnaround Time

Table 6. PBL Cost Benefit
(Fowler, 2008)

PROGRAM	Total Cost Benefit (\$M)	PROGRAM	Total Cost Benefit (\$M)	PROGRAM	Annual Cost Benefit (\$M)
F-22	\$14,000	ARC-210	\$5.4 (8.6%)	F-22	\$500 (39%)
ALR-67(v)3	\$62.7 (40%)	TH-57	\$15.3 (7.9%)	CASS CSP	\$30 (54%)
TOW-ITAS	\$350	H-60	\$41 (6.5%)	TOW-ITAS	\$6.3 (34.5%)
F/A-18	\$688	Sea Sparrow	\$2.2 (6.3%)	ARCI	\$4 (24.7%)
CGS	\$10.3 (65%)	AN/WSN-7	\$0.88 (1.3%)	MK 41 VLS	\$1.1 (16.4%)
MIDs-LVT	\$62 (54%)	AN-PSS14	\$17	F-117	\$124 (14.5%)
AN/AAS-44	\$31 (25.2%)	Sentinel	\$301.70	Navy Tires	\$46 (15%)
APUs	\$4 (20.9%)	T-45	\$85	GBMD	\$1.60
AEGIS FCS	\$8 (19.3%)	C-17	\$477	TAIS	\$0.01
F405 Engine	\$61 (17.2%)	Navy Spt Equip	\$1	H-46	\$0.35
Cockpit Disp	\$71 (16.5%)	AN/ALQ-126B	\$2.10	Program	Flying Hour Cost Reduction
F100	\$2 (16.3%)	AN/USM-638	\$0.50	LANTIRN	\$9.6 (14.6%)
AH-64 & CCAD	\$100	C-17	59%	F-404 Engine	\$79 (13.4%)
CH-47(UK)	\$250	Tornado (UK)	51%	F-414 Engine	\$6.40
Javelin	10%	Harrier (UK)	44%	Patriot	\$1 (13.1%)
RFTLTS	\$0.50	Nimrod (UK)	8%		

The wide use of performance-based logistics (PBL) contracts ultimately puts the focus on readiness and rapid, agile support. PBL enables the DoD to select providers based on competitive value, producing partnerships with preferred providers that overtime will improve the DoD's overall support capabilities (Estevez, 2005).

Conclusion

Despite fond memories of past glories, cost and schedule control have been persistent problems within defense acquisition since World War II. The DoD acquisition and lifecycle processes have proven to be impervious to incremental improvements, despite decades of study and recommendations. It is certain that for the foreseeable future we as a Nation will face a severely constrained fiscal environment that will put added downward pressure on defense and other discretionary budget elements. This situation necessitates an enterprise-wide Defense Department application of the proven lifecycle management practices that will ensure greater performance improvements and simultaneous cost savings. These significant savings opportunities in turn can be deployed to address the significant force modernization and recapitalization requirements that we face today and in the future.

The United States cannot be certain of the international security situations it will confront in the next two decades. The world security environment is likely to be dramatically different and more active than the Cold War years, the years following, and the current GWOT. This



uncertainty requires an acquisition process that is agile and efficient, enabling the DoD to rapidly field and sustain capabilities. Such a process would include:

- Effects-based requirements
- Commercially driven product development
- Industry-provided product support

These elements present fundamental change to DoD's lifecycle processes to meet the needs of the 21st century.

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2003 - 2009 Sponsored Research Topics

Acquisition Management

- Acquiring Combat Capability via Public-Private Partnerships (PPPs)
- BCA: Contractor vs. Organic Growth
- Defense Industry Consolidation
- EU-US Defense Industrial Relationships
- Knowledge Value Added (KVA) + Real Options (RO) Applied to Shipyard Planning Processes
- Managing Services Supply Chain
- MOSA Contracting Implications
- Portfolio Optimization via KVA + RO
- Private Military Sector
- Software Requirements for OA
- Spiral Development
- Strategy for Defense Acquisition Research
- The Software, Hardware Asset Reuse Enterprise (SHARE) repository

Contract Management

- Commodity Sourcing Strategies
- Contracting Government Procurement Functions
- Contractors in 21st Century Combat Zone
- Joint Contingency Contracting
- Model for Optimizing Contingency Contracting Planning and Execution
- Navy Contract Writing Guide
- Past Performance in Source Selection
- Strategic Contingency Contracting
- Transforming DoD Contract Closeout
- USAF Energy Savings Performance Contracts
- USAF IT Commodity Council
- USMC Contingency Contracting

Financial Management

- Acquisitions via leasing: MPS case
- Budget Scoring
- Budgeting for Capabilities-based Planning
- Capital Budgeting for DoD



- Energy Saving Contracts/DoD Mobile Assets
- Financing DoD Budget via PPPs
- Lessons from Private Sector Capital Budgeting for DoD Acquisition Budgeting Reform
- PPPs and Government Financing
- ROI of Information Warfare Systems
- Special Termination Liability in MDAPs
- Strategic Sourcing
- Transaction Cost Economics (TCE) to Improve Cost Estimates

Human Resources

- Indefinite Reenlistment
- Individual Augmentation
- Learning Management Systems
- Moral Conduct Waivers and First-term Attrition
- Retention
- The Navy's Selective Reenlistment Bonus (SRB) Management System
- Tuition Assistance

Logistics Management

- Analysis of LAV Depot Maintenance
- Army LOG MOD
- ASDS Product Support Analysis
- Cold-chain Logistics
- Contractors Supporting Military Operations
- Diffusion/Variability on Vendor Performance Evaluation
- Evolutionary Acquisition
- Lean Six Sigma to Reduce Costs and Improve Readiness
- Naval Aviation Maintenance and Process Improvement (2)
- Optimizing CIWS Lifecycle Support (LCS)
- Outsourcing the Pearl Harbor MK-48 Intermediate Maintenance Activity
- Pallet Management System
- PBL (4)
- Privatization-NOSL/NAWCI
- RFID (6)
- Risk Analysis for Performance-based Logistics
- R-TOC Aegis Microwave Power Tubes



- Sense-and-Respond Logistics Network
- Strategic Sourcing

Program Management

- Building Collaborative Capacity
- Business Process Reengineering (BPR) for LCS Mission Module Acquisition
- Collaborative IT Tools Leveraging Competence
- Contractor vs. Organic Support
- Knowledge, Responsibilities and Decision Rights in MDAPs
- KVA Applied to Aegis and SSDS
- Managing the Service Supply Chain
- Measuring Uncertainty in Earned Value
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“Why did we have to bypass existing institutions and procedures to get the capabilities we need to protect our troops and pursue the wars we are in?”

**Secretary of Defense Robert Gates
at September 2008, The National Defense
University**



Defense Acquisition in Transition
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1945 - 1990

Present

Threat

Bipolar (Soviet Union)

Multi-polar (Terrorism, near-peer competitors, and rogue states)

Technology

Military technology the driving force

Commercial technology the driving force

Requirements

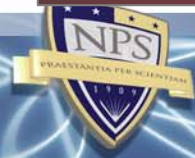
Stable and predictable requirements. Match or counter Soviet weapons systems

Unpredictable and unstable with the multiplicity of threats and adversaries behavior

Acquisition& Sustainment:

Conventional industrial competitors enabled DoD to capitalize on competitive market forces. Incremental change

Global War on Terror Demands, Current Market Dynamics



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Current Dynamics

- Cost and Schedule Growth
- Personnel Shortage
- Complex Threat
- New Administration



The Industrial Base



"It's not the responsibility of this building to worry about the economic impact of budgetary decisions. It's the responsibility of the secretary and this building to provide recommendation to the president about what's in the best interest of our national security."



Pentagon Press Secretary
Geoff Morrell



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The DoD “Death Spiral”





For 60 years, DoD attempted to improve its life cycle process through incremental changes

- **Carlucel Initiatives**
- **Speciflcation and Standards reform**
- **Joint Capabilities Integration Development System (JCIDS)**
- **Packard Commiission**



Acquisition Reform Act 2009

Acquisition Organization

- *System Engineering Capabilities*
- *Developmental Testing*
- *Technological Maturity Assessments*
- *Independent Cost Assessment*
- *Role of Combat Commanders*

Acquisition Policy

- *Trade-offs of Cost, Schedule and Performance*
- *Preliminary Design Review (PDR)*
- *Life Cycle Competition*
- *Nunn-McCurdy Breaches*
- *Organizational Conflicts of Interest*
- *Acquisition Excellence*



Proposed Solution

The DoD acquisition and life cycle processes have proven to be impervious to incremental improvements

Fundamental Change is Critical

- Effects-based Requirements = Effective cost/performance trades
- Commercially Driven R&D Model = Instill technology and requirements discipline
- Industry Provided Life Cycle Product Support based on best-in-class performance

